plug 13 includes a central aperture 23 into which are inserted the twisted ends of the connecting lead 14 passed through the two holes in a ceramic insulator body 24. With a free space being left, the connecting lead 14 is additionally screened by a supply duct or tube 27, through which the forced circulation of the gaseous oxygen carrier supply from above is carried out.

Location of the electrolyte 13 in the protective tube 12 can be additionally ensured by resilient means, such as illustrated for instance in Fig. 3.

Figs. 4*a* and 4*b* show electrolytes 32, 32′ respectively cast into protective tubes 31, 31′.

Referring to Fig. 5, the electrolyte 34 arranged in a protective tube 33 is embedded in a fire-resistant material 36.

In Fig. 6, a measuring lance 61 has an immersion head 62 consisting of fire-resistant material and is connected by means of a clamp connector 63. The head 62 and the exposed end of the measuring lance 61 are screened by means of a thermal insulator 64. At the dip end, a U-tube 67 of high-temperature-resistant non-conductive material is embedded in the dip head 62 containing a medium gaseous at the measuring temperature disposed in a hollow space 66, so that one limb 671 is coupled with the hollow space 66, whereas the other limb 672 discharges into a channel 68 formed in the dip head 62. Through an aperture in the base of the U-tube 67, a plug-like electrolyte 69 projects with which a contact wire 71 is connected which is guided through the limb 672 of the U-tube and the channel 68 to the dip head 62 and is connected via the connection plug 63 and a lead 72 with a potential measuring instrument (not shown) which is in turn connected by the lead 73 and the plug connector 63 with a short-circuit contact 74 located in the dip head 62. During the measuring process, that is with the dip head 62 immersed in the molten metal, the medium which is gaseous at the measuring temperature passes into the hollow space 66 and flows through the U-tube 67, so that it passes along the contact wire 71 with which it forms the counter-electrode. The gaseous medium escapes through the channel 68, which is connected via the plug connector 63 with an outlet union 75.

The use of the U-tube is not bound to the described embodiment of the dip head, with the hollow space containing the gaseous medium formed therein, but can obviously be used in connection with dip heads which have a gaseous medium supplied from outside which, together with the contact wire forms the comparison electrode. As can be seen from the dip head 76 shown in diagrammatic form in Fig. 7, the measuring contacts, namely the electrolyte 77 and the short-circuit contact 78, can be protected by a fusable block or sleeve 79 so that the dip head can be put into molten metal covered with slag without being damaged by immersion in the slag.

WHAT WE CLAIM IS:—

1. A device for determining the activity particularly of oxygen in a metal bath, wherein the molten metal constituting the bath represents an electrode when the device is in use, comprising a high-temperature-resistant electrolyte for immersion in the molten metal, the electrolyte being a plug member located in and projecting sealingly from a fire-resistant, non-conductive carrier tube, the plug member being connected via a contact wire disposed in the carrier tube with a potential measuring instrument arranged for connection with the molten metal in use, the contact wire constituting together wih an oxygen-containing medium gaseous at the measuring temperature which is supplied to the carrier tube, the comparison electrode.

2. A device according to claim 1, in which the carrier tube is cylindrical and downwardly-tapering to the immersible end and the electrolyte plug member is of conical form.

3. A device according to claim 2, in which the plug is held in position by means of a spring acting upon it.

4. A device according to claim 1, in which the carrier tube reduces towards the immersible end and the plug has a projection extending from the tube and is embedded in a fire-resistant material located in the tapering end of the tube.

5. A device according to claim 4, in which the part of the plug located in the carrier tube is essentially spherical.

6. A device according to claim 1, in which the carrier tube is a U-tube having in the base an aperture into which the plug-like electrolyte projects.

7. A device according to claim 6, in which the plug fits the internal diameter of the carrier tube and includes an insert projecting through the bore of the carrier tube and projecting from the carrier tube.

8. A device according to claim 5, in which the inner wall of the carrier tube is hollowed out for receiving the electrolyte.

9. A device according to claim 1, 2, 5, 6, 7 or 8, in which the electrolyte is cast into the carrier tube.

10. A device according to any preceding claim, including a clamp connection between the electrolyte and the contact wire.

11. A device according to claim 10, in which the electrolyte includes an aperture into which the twisted ends of the contact wire are inserted.

12. A device according to claim 11, in which the plug includes at least one aperture extending into the base of the carrier tube.

13. A device according to any preceding claim, in which the carrier tube, the electrolyte

and the comparison electrode are combined in one unit which is locatable in a measuring lance.

14. A device according to claim 13, in which a measuring head comprising the carrier tube, electrolyte and comparison electrode is provided with a short-circuit contact for the potential measuring instrument and is also provided with a clamp connection for connecting the comparison electrode and that of the short-circuit contact to the potential measuring device.

15. A device according to any preceding claim, including a support magnet for connecting the potential measuring device to the vessel containing the metallic bath.

16. A device according to any preceding claim, in which the free end of the electrolyte or the measuring head is surrounded by a fusable sleeve or block.

17. A device according to claim 1, substantially as hereinbefore described with reference to Figs. 1 and 2, Fig. 3, Fig. 4*a*, Fig. 4*b*, Fig. 5, Fig. 6 or Fig. 7 of the accompanying drawings.

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